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Filed : April 19, 2002

REMARKS

In the Office Action, the Examiner rejected Claims 1, 2, and 6-14 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement thereof. The Examiner notes that the specification of the subject application states that the penetrator 1 and the rocket motor 10 are interconnected via the release mechanism which is activated as soon as the rocket motor is burned out and retardation of the missile occurs. Further that this retardation activates the ball retainer ring which due to the inertia thereof moves forward against the bias of the spring means to release the locking balls thus separating the penetrator from the rocket motor. The Examiner argues that the application lacks adequate description and enabling disclosure of how and in what manner the moment of inertia of the ball retainer ring would be sufficient to overcome all other forces including for example the spring force, friction, etc. to enable the locking balls to be released and thus allow separation of the penetrator and rocket motor. The Examiner notes that all components are interconnected and are traveling together as a unit. The Examiner also questioned what is meant and encompassed by the claim limitations "one in the forward closure received and movable lock" and "polar boss".

The Applicant thanks the Examiner for noting this discrepancy and hereby amends Claim 1 to recite "... one locking means retainer received in the forward closure so as to be axially movable ...". The Applicant notes that this change is to correct a clerical error in the preliminary amendment submitted upon entry into the national phase of this international application and to change the phrasing of the claim limitation to more closely conform with standard American English usage. As to the enabling written description of the claimed subject matter, the Applicant respectfully directs the Examiner's attention to Figures 3-5 and the description of page 4, line 4, through page 5, line 31. In particular, the Applicant notes that the lock retainer ring (element 2) is arranged within the release mechanism so as to be axially slidable but biased by the spring means 6 in a direction opposite to the direction of movement for the missile (see page 4, lines 25-27). Further, the release mechanism comes into force as soon as the rocket motor is burned out and retardation of the missile occurs. This retardation activates the lock retainer ring which due to the inertia thereof moves forward against the springs 6 and compresses the spring.

Thus while the Examiner is correct in his indication that the various components of the release mechanism are interconnected, the lock retainer ring portion is free to move axially against

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the bias of the spring. While the other components, such as the locks, are held in place in the recesses 14 without possibility of substantial movement until the lock retainer ring moves to a release position. The Applicant further notes that the lock retainer ring is positioned within the interconnected projectile and rocket motor so as to be shielded against the airflow against the missile in flight such as by the control fin part 8 and ogive 11. Thus, air drag acting upon the missile will induce retardation or a deceleration due to air drag once the rocket motor is burned out thus slowing the components of the missile exposed to the air drag as well as parts interconnected thereto. However the lock retainer ring, being axially movable, would continue to move at the velocity at which motor burnout occurs and that the linear inertia of the lock retainer ring arising from the mass and velocity thereof would provide an inertia force acting against the bias of the spring. The Applicant believes that suitable construction and material choice of the lock retainer ring, such as providing sufficient mass and reduced surface friction and selection of appropriate spring rates and pre-load so as to overcome the spring bias as well as frictional and other forces to be well within the understanding and capability of an ordinary artisan in this field. The Applicant thus believes that the subject application as filed does provide an enabling written description under the requirements of 35 U.S.C. § 112, first paragraph, for the claim limitations as currently amended.

Regarding the term "polar boss", the Applicant respectfully notes that this term is commonly used within the particular technical field of rocket motors, missiles, and penetrators and that the term "boss" is to be accorded its customary typical meaning. The "polar" distinction is simply to indicate the location of the boss generally along a central axis and at an end thereof, such the "polar" region as of a planet or other celestial body.

The Examiner also rejected Claims 11-14 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. More particularly, the Examiner notes that there is no support in the original disclosure for stating that the spring biasing member (spring 6) engages the locking member (locking ball 3) and notes that instead the spring 6 actually engages the ball retainer 2. The Applicant thanks the Examiner for noting this discrepancy and hereby amends Claim 11 to recite the further limitation that the claimed invention also comprises "... a locking member retainer that couples the at least one locking member to both the projectile and the rocket motor and a spring biasing member that engages with the locking member retainer so as to maintain the at least one locking member and engagement between the rocket motor and the projectile ..."

(Claim 11 as currently amended).

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The Examiner also indicated that the original disclosure lacks support for the rocket motor disengaging the movable locking retainer. The Applicant also thanks the Examiner for noting this discrepancy and hereby amends Claim 11 to recite the limitation "... wherein, when the rocket motor burns out, retardation induces the movable locking member retainer to inertially compress the spring biasing member thereby permitting the at least one locking member to disengage between the projectile and the rocket motor ..." (Claim 12 as currently amended).

The Examiner also rejected Claims 1, 2, and 6-14 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. The Applicant believes that the claims as currently amended as addressed above with regards to the Examiner's rejection under 35 U.S.C. § 112, first paragraph, now also comply with the requirements of 35 U.S.C. § 112, second paragraph.

The Examiner also rejected Claims 1, 2, 8, and 10-14 under 35 U.S.C. § 102(b) as being anticipated by Hansche (US 2,655,105). The Applicant has carefully reviewed the Hansche '105 reference and respectfully notes that the Hansche device is of a different construction and of a different operating principle than the Applicant's claimed invention as amended by this paper. In particular, the Applicant notes that the steel balls 42 are forced radially inward against the tube 34 and between its shoulder 44 and the disk 28 by the camming action of the inclined inner wall 46 of a cup 48 carried on a threaded plug 50 extending through a tapered axial bore 52 in the motor fitting 22. The balls 42 lock the two sections 12 and 14 (the rocket motor section and warhead section) together against the separating effect of the spring 58 by reason of there being placed between the disk 28 and the radial flange 36 of the tube 34. "After the aerial missile 10 has been launched and is in free flight, the gas pressure in the rocket motor section 12 acts against the rear end 68 of the plug 50 ... At the end of the burning period of the propellant in the rocket section 12, the gas pressure decreases to a value at which the spring 58 can force the plug 50 and cup 48 rearwardly to release the balls 42 ..." (*cf.* Column 2, lines 40-45, 52-55, and Column 3, lines 6-11, 16-20).

Thus, the cup 48 which secures the steel balls 42 in place so as to join the rocket motor and warhead sections moves forward during burn of the rocket motor and shifts rearward as the motor fuel is consumed to release the balls. Whereas in the Applicant's claimed invention, the lock retainer ring moves forward rather than rearward upon burnout of the motor to release the at least one lock (balls) and operates under inertia rather than the gas pressure of the Hansche '105 device. The Applicant respectfully notes the simplified mechanism and operating concept of the Applicant's

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claimed invention with respect to the Hansche '105 device and also the avoidance of dependence upon high temperature erosive, combustion gases of the rocket motor to operate the release mechanism of the Applicant's invention. Thus, the Applicant believes that the application as currently amended does distinguish over the teachings of Hansche '105 and that Claims 1, 2, and 6-14 are patentable under the requirements of 35 U.S.C. § 102(b).

The Examiner also rejected Claims 6 and 7 under 35 U.S.C. § 103(a) as being unpatentable over Hansche '105 in view of either Madderra et al (US 4,628,821) or Forman et al (US 3,439,615). The Applicant has reviewed both the Madderra et al '821 and the Forman et al '615 references. The Applicant respectfully notes that the combined teachings of either Madderra et al '821 or Forman et al '615 when combined with the teachings of Hansche '105 still fail to teach the Applicant's claimed invention. In particular, Madderra et al '615 teaches a release mechanism between a projectile and rocket motor in a missile, however one that is constructed and arranged such that an actuation mass 36 is biased in a forwards direction by a spring 34 so as to secure the penetrator and rocket motor together via steel balls 38 engaged between a groove 52 of the penetrator and a recessed portion 54 of the actuation mass 36 as shown in Figure 5. Upon the forward acceleration of the ignited rocket motor, the actuation mass 36 shifts rearwardly as shown in Figure 6 so as to free the balls 38. The actuation mass 36 is also provided with spring tabs 61 which move inwardly as the actuation mass 36 shifts rearwardly so as bear against a surface 64 of a flange 46 to prevent return, i.e. forward movement of the actuation mass 36 as shown in Figure 7. The balls 36 move out of the engagement position either by centrifugal force of a spinning rocket or by cam-out force of the groove 52.

Thus, the release mechanism of Madderra et al '821 releases the locking steel balls 38 via rearward movement of the actuation mass 36 upon acceleration of the rocket motor during motor burn and not upon forward movement of a lock retainer ring upon motor burnout and consequent retardation as in the Applicant's claimed invention. Thus, the Applicant believes that Claim 1 as currently amended is patentable under the requirements of 35 U.S.C. § 103(a) over the combined teachings of Hansche '105 in view of Madderra et al '821 and that as Claims 6 and 7 properly depend from and further define the independent Claim 1, they are also patentable under the requirements of the section over the combined teachings of Hansche '105 and Madderra et al '821.

The Applicant notes that Forman et al '615 teaches a rifle grenade fusing device which is constructed so as to be usable with conventional ball ammunition firing a projectile as well as the

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typical grenade blank cartridges used for firing rifle grenades. The Applicant respectfully notes however that Forman et al '615 does not teach any release mechanism such as between a projectile and a rocket motor, as the various components parts of the Forman et al '615 device remain interconnected until the point of detonation of the grenade. Further, the relative movement of the outer housing 17 and inner housing 20 operates under the force of impact of the bullet or the gas pressure of the grenade blank cartridge and not by retardation accompanying a rocket motor burnout as in the Applicant's claimed invention which as noted is lacking in the Forman et al '615 device. Thus, the Applicant believes that Claim 1 as currently amended is patentable under the requirements of 35 U.S.C. § 103(a) over the combined teachings of Hansche '105 in view of Forman et al '615 and that as Claims 6 and 7 properly depend from and further define the Applicant's claimed invention that they are likewise patentable under the statute.

The Examiner also rejected Claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Hansche '105 in view of Crockett (US 3,457,861). The Applicant has reviewed the Crockett '861 reference and notes that Crockett '861 teaches components of a release mechanism in a missile including a piston 24 which is provided in a bore 21 with a plug 26 of combustible material placed in a bore 23 interposed between the piston bore 21 and the interior of the hollow core rocket motor. The combustible plug 26 temporarily blocks exposure of the piston 24 to the high pressure and temperature gases created by combustion of the rocket motor material until such time as sufficient acceleration has occurred to thereby avoid unintended separation of the missile parts. As the plug 26 is consumed, the high pressure gas from the rocket motor is free to bear upon the piston 24 which slides forward through the bore 21 impinging upon the forward missile part 12 so as to induce separation therebetween. Thus, Crockett '861 fails to teach the Applicant's invention as claimed in Claim 1 as currently amended as discussed above regarding Hansche, and that Claim 1 and Claim 9 depending therefrom are not obvious under the requirements of 35 U.S.C. § 103(a) over the combined teachings of Hansche '105 and Crockett '861.

The Examiner also rejected Claim 10 under 35 U.S.C. § 103(a) as being unpatentable over the combined teachings of Hansche '105 and Nilsson (Swedish 508 072) as cited by the Applicant. The Applicant respectfully notes that Nilsson teaches a missile penetrator combination for use against either of armored or unarmored targets where the penetrator is released from the rocket motor portion prior to impact with an armored target however the penetrator remains connected to the rocket motor portion when fired against unarmored targets. The applicant respectfully notes

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however that Nilsson does not teach the details of how this selective release is performed and does not teach the particular details of a release mechanism as claimed by the Applicant. Thus, the Applicant believes that the teachings of Nilsson when combined with the teachings of Hansche '105 still fail to teach or suggest the Applicant's claimed invention under the requirements of 35 U.S.C. § 103(a) and that Claim 1 and Claim 10 depending therefrom are patentable.

The Examiner also objected to the drawings under 37 CFR 1.83(a) noting that the drawings must show every feature specified in the claims. More particularly, the Examiner notes that the feature of the boss having a circumferential groove must be shown or the feature cancelled from the claims and notes that entry of new matter is not permitted. The Applicant thanks the Examiner for noting this discrepancy and hereby strikes the claimed feature from Claim 1 as currently amended. The Examiner also noted that the Examiner has difficulty determining the shapes, relationships, etc. between elements 7, 7', 17, 18, 4, 6, 14, 3, 2, and 13 and is requiring new drawings under 37 CFR 1.81 to clearly illustrate such shapes, relationships, etc. to facilitate understanding of the invention. The Applicant hereby submits a revised enlarged version of Figure 3 which the Applicant trusts will enable the Examiner to clearly understand the shapes and relationships between these components.

The Applicant also notes the Examiner's indication that the specification must be updated to include application numbers or patent numbers for the other applications cited in the subject application. The Applicant thanks the Examiner for noting this and notes that appropriate patent numbers have been entered for the related applications, now U.S. patents.

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SUMMARY

From the foregoing, the Applicant believes that the application as currently amended complies with the requirements of 35 U.S.C. § 112, first and second paragraphs, as discussed above. The Applicant further believes that the claims are patentable under the requirements of 35 U.S.C. § 102(b) over the teachings of Hansche and under the requirements of 35 U.S.C. § 103(a) over the combined teachings of Hansche, Madderra et al, Forman et al, Crockett, and Nilsson, taken in any combination. The Applicant also believes that the drawings comply with the requirements of 37 CFR 1.83(a) and 37 CFR 1.81. The Applicant thus believes that the application is now in a condition ready for allowance and respectfully requests prompt issuance of a Notice of Allowance. The Applicant believes that this paper is fully responsive to the rejections and objections made by the Examiner in the Office Action. However, should there remain any further impediments to the allowance of this application that might be resolved by a telephone conference, the Examiner is respectfully requested to contact the Applicant's undersigned representative at the below-indicated telephone number.

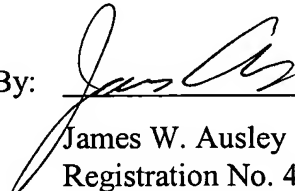
Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 7/16/04

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